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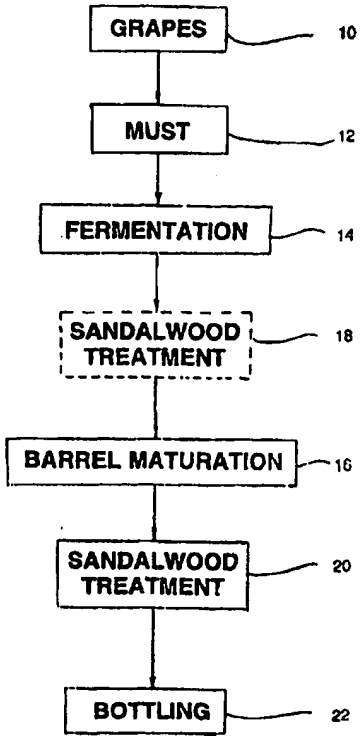
(54) Title: FLAVOUR ENHANCING PROCESS

(57) Abstract

A flavour enhancing process for alcoholic beverages, particularly wines. The process involves treating the alcoholic beverage with an effective exposure to sandalwood. Species of sandalwood native to Australia, such as *Santulum spicatum*, are particularly effective for flavour enhancement. The beverage is exposed to wood shavings from the sandalwood tree, or a solid piece of sandalwood timber may be introduced into the wine or incorporated in the structure of a wine storage container. Sandalwood treatment provides a distinctively Australian style of wine.



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FLAVOUR ENHANCING PROCESS

FIELD OF THE INVENTION

The present invention relates to a flavour enhancing process for alcoholic beverages using sandalwood and relates particularly, though not exclusively, to such a flavour enhancing process for wines.

BACKGROUND TO THE INVENTION

Wine barrels or casks made from oak have been used for centuries for the storage and maturation of wine. Oak wood was originally chosen not primarily for its flavour enhancing properties, but for its mechanical properties. Oak timber has a degree of porosity which allows it to absorb sufficient wine to cause a slight swelling of the timber which helps to seal the cask, but is not so porous as to allow seepage of the wine. When the wine was stored for significant lengths of time in oak casks, the flavour enhancing properties of the timber became evident. Today oak wood is still being used, primarily for its flavour enhancing properties.

American and French oak are most widely used, particularly *Quercus alba* (American) and *Quercus robur* or *Sessilis* (French). The containers vary in volume from 225 litres up to 1000 litres or more. As the cost of wood and storage space and the length of time for maturation in oak barrels has made the traditional technique expensive, new techniques for achieving a similar flavour enhancing effect have been developed. These include:

(1) Oak chips - placed directly into the wine
(2) Oak shavings - placed directly into the wine
(3) Inner stave - solid pieces of oak wood, immersed in wine
(4) Oak extracts - added to the wine

In recent years the Australian wine industry has experienced a rapid expansion into export markets as the high quality and

excellent flavours of Australian wines have become more widely known. Australian wine makers enjoy a reputation for fine wines and a mastery of both traditional and innovative wine making techniques. However, by and large, the flavour of many Australian wines is still enhanced with American, French or European oak wood using the traditional maturation process or one of the new techniques noted above. To some extent this detracts from the uniquely Australian character of the wines and has prevented the full development of a distinctive Australian style of wine making.

SUMMARY OF THE INVENTION

The present invention was developed with a view to providing a flavour enhancing process for alcoholic beverages which is distinctly Australian, by using a native Australian timber for wood maturation instead of oak wood.

According to one aspect of the present invention there is provided a flavour enhancing process for alcoholic beverages, the process comprising:

treating the alcoholic beverage with an effective exposure to sandalwood wherein the flavour of the beverage is enhanced.

Preferably the sandalwood is a species of sandalwood native to Australia. More preferably the sandalwood is of the species *Santulum spicatum*.

Typically the alcoholic beverage is a wine or a wine-based spirit. Advantageously the wine is exposed to wood shavings from the sandalwood tree. Either fine wood shavings, coarse wood shavings or wood chips may be employed. Alternatively a solid piece of sandalwood timber may be introduced into the wine or incorporated in the structure of a wine storage container. For example, one or more staves of a wooden barrel in which the wine is matured could be made of sandalwood timber.

Preferably the wood is derived from near the base or root of the sandalwood tree for the best flavour enhancement. Advantageously the wood is first naturally dried or toasted or artificially dried to enhance desirable flavours. The drying process helps to remove an undesirable resinous character in the flavour. A small quantity of the wine may be heavily treated and then blended back to give the desired level of treatment.

According to another aspect of the present invention there is provided an alcoholic beverage which has been treated with an effective exposure to sandalwood to enhance its flavour.

Although the following description will be given primarily with reference to enhancing the flavour of wines, it is to be understood that the process may also be employed for enhancing the flavour of other alcoholic beverages, for example, spirits.

BRIEF DESCRIPTION OF DRAWING

In order to facilitate a better understanding of the invention a preferred embodiment of the flavour enhancing process will now be described in detail, by way of example only, with reference to the accompanying drawing in which:

Figure 1 is a flow chart illustrating one way in which the flavour enhancing process in accordance with the invention may be applied.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

In order to develop a uniquely Australian flavour enhancing process for wines, many different types of native Australian flora were tried and tested. These included plant material from various *Eucalyptus* species, including *jarrah, marri, wandoo, karri* and *tea tree; Casuarina* species, including *sheoak* and *jam; Santalum* species, including *spicatum, albums* and *lanceolatum; Banksia* species and *Acacia* species. Wood

from the species of sandalwood tree, *Santulum spicatum* which is native to Western Australia, appeared to have the best flavour enhancing properties, although the other species of sandalwood noted above also gave favourable results.

Several species of sandalwood tree are native to Australia, including *Santulum spicatum* and *lanceolatum*, and various species are also found overseas, for example, in Indonesia and India. The aromatic properties of the oil from the sandalwood tree have long been known and valued, particularly by the Chinese. A significant quantity of wood from the Western Australian species *Santulum spicatum*, is still being exported and used in China to manufacture incense sticks. For similar reasons, oil from the sandalwood tree is also used in aromatherapy. Timber from the sandalwood tree is fine grained and relatively soft, and is popular with craftsmen for woodcarving. Not withstanding these known properties of sandalwood, the use of wood from the sandalwood tree to enhance the flavour of edible products was not previously known, although research indicates that the essential oils from sandalwood are non-toxic.

The present invention is based on the discovery that the flavour of wine treated by exposure to sandalwood, particularly of the species *Santulum spicatum*, is significantly enhanced. It is thought that the high levels of total ethanol soluble extractives in the wood oil from *Santulum spicatum* provides the principal flavour enhancing qualities. Chemical analysis from *Santulum spicatum* reveals a complex chemical composition which includes: trans, trans-farnesol, epi-α-bisabolol (anymol), α-santalol, (Z)-nuciferol, cis-ß-santalol, $C_{15}H_{26}O$ (alcohol), dendrolasin, geranylacetone, ß-curumene, ß-bisabolene, $C_{15}H_{24}$, α-santalene, and an isomer of α-bergamotene. Although sandalwood is made up of many chemical components, it is thought that the higher alcohols, natural tannins and other polyphenols give the wine aromatic lift and improved palate flavour and texture. In

any case, it is direct exposure to the wood itself which is found to produce the best flavour enhancing effects in the wine.

It has been found that a new or green sappy piece of sandalwood is not as effective in enhancing the flavour as an aged or dried piece of sandalwood. Furthermore, wood from the base or roots of the sandalwood tree is found to have improved flavour enhancing properties, perhaps due to the concentration of essential oils in these parts of the tree. The wood may be artificially dried or toasted to enhance the desirable flavours.

The wine may be exposed to the sandalwood in a variety of ways, depending on various factors. These may include both traditional and modern wood maturation techniques. For example, an oil extract from the sandalwood tree may be added to the wine, or wood shavings (fine or coarse) and/or wood chips may be suspended in the wine container for a predetermined period of time depending on the degree of flavour enhancement it is desired to achieve. Alternatively, the wine may be exposed to solid pieces of wood from the sandalwood tree, either as free pieces (staves) immersed in the wine or as structural components of a storage container.

Figure 1 illustrates in flow chart form a typical process for producing wine which incorporates a preferred embodiment of the flavour enhancing process according to the invention. In order to produce wine, the grapes 10 are initially harvested, the stems removed and the berries crushed to form a must 12. The must is then allowed to ferment 14 in a suitable fermentation vat. Preservatives, yeast and other additives are added during fermentation according to known wine making procedures. Following fermentation, the must is typically transferred to wooden barrels for maturation 16. Sandalwood treatment in accordance with the invention preferably occurs immediately before 18 or after 20 barrel maturation 16. If

sandalwood treatment 18 occurs before barrel maturation, it may replace barrel maturation altogether depending on the type of wine and the flavour desired to achieve. If sandalwood treatment 20 occurs after barrel maturation, the wine may be treated in the same barrels or transferred to new barrels. Sandalwood treatment of the wine in the same barrels may be achieved by suspending wood shavings or wood chips in the barrel. Sandalwood treatment in different barrels may be achieved by replacing parts of a conventional oak barrel, for example the end boards, with sandalwood staves, or by inserting a sandalwood inner stave within the barrel. To achieve an effective exposure to the sandalwood, the wine must typically be in direct contact with the wood for between three weeks to three months. When barrel maturation and sandalwood treatment are completed, the wine is ready for bottling 22. The flavour enhancing properties of an effective exposure of sandalwood may continue to enhance the flavour of the wine after bottling with aging.

A batch of 1994 Cabernet Sauvignon wine was treated with an effective exposure to sandalwood as follows. After six months of normal oak maturation approximately 30 gram of sandalwood chips was added to a 225 litre barrel and allowed to mature for a period of four weeks. The wood chips were suspended in the wine in a gauze mesh bag. This flavour enhanced wine was then blended back into 2200 litres of the bulk wine. After bottling the wine has maintained the spicy, cedar characters given by the sandalwood treatment, and has continued to improve with aging.

Similar trials have also been carried out using chardonnay which has had some oak maturation. The wine is manufactured according to normal practice until the maturation stage, where differing techniques of using sandalwood as described above are used. Various forms of grape spirit have also been used in a variety of trials incorporating sandalwood. Neutral spirit and brandy spirit have produced encouraging results when flavoured with sandalwood.

A significant advantage of wood from the sandalwood tree *Santulum spicatum* is that its flavour enhancing properties are much stronger than that of oak wood. Hence, an effective exposure of the wine to the sandalwood may require a much smaller quantity of the wood and/or less time than would be required with oak wood maturation. Thus, in a wooden cask or barrel used for wood maturation, only one or two staves of the barrel need be manufactured from sandalwood to achieve a significant flavour enhancing effect. Because less wood is needed, the use of sandalwood is much less expensive than oak. Furthermore, in Australia the sandalwood can be locally sourced.

Clearly, the use of sandalwood to enhance the flavour of alcoholic beverages, particularly wines, has a number of significant advantages over the use of oak wood, including:

(i) local species of sandalwood provide a distinctively Australian style;

(ii) the flavour enhancing properties are much stronger than oak and therefore less wood is required to achieve an effective treatment;

(iii) it can be used in both traditional and modern wood maturation techniques; and,

(iv) it is locally sourced.

Now that preferred embodiments of the flavour enhancing process has been described in detail, numerous various and modifications will suggest themselves to persons skilled in the wine making arts, in addition to those already described, without departing from the basic inventive concepts. For example, a small quantity of the alcoholic beverage can be heavily treated and then blended back in a larger volume to give the desired level of treatment. All such variations and modifications are to be considered within the scope of the present invention, the nature of which is to be determined from the foregoing description and the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A flavour enhancing process for alcoholic beverages, the process comprising:

treating the alcoholic beverage with an effective exposure to sandalwood wherein the flavour of the beverage is enhanced.

2. A flavour enhancing process as defined in claim 1, wherein the alcoholic beverage is exposed directly to wood from a sandalwood tree.

3. A flavour enhancing process as defined in claim 2, wherein the alcoholic beverage is exposed to wood shavings or wood chips from the sandalwood tree.

4. A flavour enhancing process as defined in claim 2, wherein the alcoholic beverage is exposed to a solid piece of sandalwood timber introduced into the beverage or incorporated into the structure of a storage container.

5. A flavour enhancing process as defined in claim 4, wherein one or more staves of a wooden barrel in which the beverage is matured are made of sandalwood timber.

6. A flavour enhancing process as defined in claim 1, wherein the sandalwood is a species of sandalwood native to Australia.

7. A flavour enhancing process as defined in claim 6, wherein the sandalwood is of the species *Santulum spicatum*.

8. A flavour enhancing process as defined in claim 7, wherein the wood is derived from near the base or root of the sandalwood tree for the best flavour enhancement.

9. A flavour enhancing process as defined in claim 2,

wherein the wood is first naturally dried or toasted or artificially aged to enhance desirable flavours.

10. A flavour enhancing process as defined in any one of the preceding claims, wherein the alcoholic beverage is a wine or a wine-based spirit.

11. An alcoholic beverage which has been treated with an effective exposure to sandalwood to enhance its flavour.

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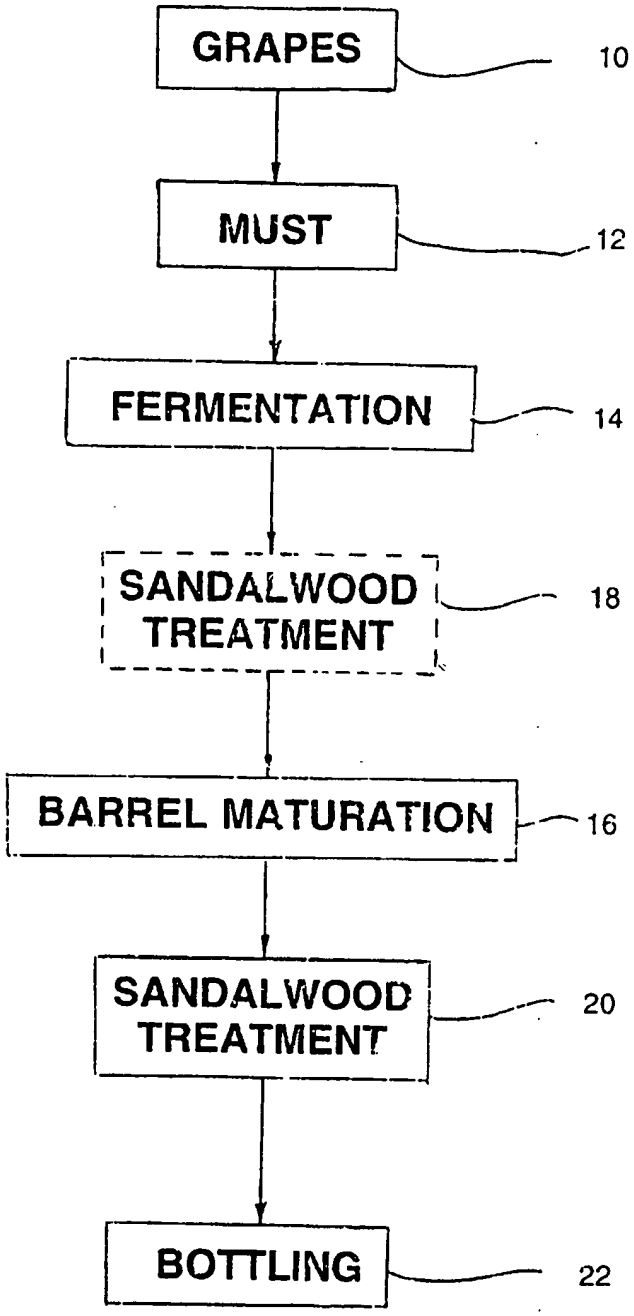
GRAPES
10
MUST
12
FERMENTATION
14
SANDALWOOD TREATMENT
18
BARREL MATURATION
16
SANDALWOOD TREATMENT
20
BOTTLING
22

FIG. 1.

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 97/00268

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl[6]: C12G 3/07; A23L 1/226

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C12G 3/04, 3/06, 3/07; A23L 1/226, 2/56

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WPAT: IPC As Above + (SANDALWOOD OR SANT#LUM)
CASM:SANDALWOOD OR SANT#LUM

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AU,A,29746/95 (DRAGOCO GERBERDING & CO. AG) 7 March 1996 Page 9 and claim 4	1
X	Derwent Abstract Accession No. 94-114242, Class D16,JP,A,06-062828 (TAKEDA) 8 March 1994 Abstract	1-5,11
X	Derwent Abstract Accession No. 78-49843A, Class B02 C02 D13 E13 P15, CH,A,600800 (FIRMENICH SA) 30 June 1978 Abstract	1,11

[X] Further documents are listed in the continuation of Box C

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INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 97/00268

C (Continuation) **DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Derwent Abstract Accession No. 78-49842A, Class B02 C02 D13 E13 P15, CH,A,600799 (FIRMENICH SA) 30 June 1978 Abstract	1,11
X	Derwent Abstract Accession No. 78-49841A, Class B02 C02 D13 E13 P15, CH,A,600798 (FIRMENICH SA) 30 June 1978 Abstract	1,11
X	Derwent Abstract Accession No. 78-49840A, Class B02 C02 D13 E13 P15, CH,A,600797 (FIRMENICH SA) 30 June 1978 Abstract	1,11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.
PCT/AU 97/00268

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member			
AU	29746/95	WO	9606820	DE	4432401
					END OF ANNEX